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| 09/847,622 | 05/02/2001 | Manfred Horstmann | 2000.064200 | 5606 |
| 23720 | 7590 | 11/18/2003 | | |
| WILLIAMS, MORGAN & AMERSON, P.C. 10333 RICHMOND, SUITE 1100 HOUSTON, TX 77042 | | | | |
| | | | EXAMINER FENTY, JESSE A | |
| | | | ART UNIT 2815 | PAPER NUMBER |

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/847,622

Applicant(s)

HORSTMANN ET AL.

Examiner

Jesse A. Fenty

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9,27-31 and 33-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,27-31 and 33-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Allowable Subject Matter

The indicated allowability of claims 1, 2 and 4-9 is withdrawn in view of the newly discovered reference(s) to Yu (U.S. Patent No. 6,630,712 B2). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4-8, 27-31 and 33-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Yu (U.S. Patent No. 6,630,712 B2)

The applied reference has a common Assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

In re claim 1, Yu (Figs. 1-6) discloses a semiconductor device, comprising:

A substrate (14);

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An active region (top surface of 14) defined in said substrate;

A gate insulation layer (38) formed above said active region; and

A gate electrode formed above said gate insulation layer, said gate electrode having a middle portion (56) located over the active region, said middle portion having an extension of an upper part (66) along the gate length direction that decreases from bottom to top of the upper part, and said middle portion also having a gate length and a gate height, wherein a cross-sectional area of said gate electrode in a plane defined by said gate length and said gate height of the middle portion exceeds a value obtained by multiplying the gate length by the gate height.

The relationship regarding the cross-sectional area is an inherent feature of the prior art, demonstrated by the prior art having the same structure as the claimed invention.

In re claim 2, Yu discloses the device of claim 1, wherein a lower part of said middle portion has a cross-sectional area in the plane defined by the gate length and the gate height that is substantially rectangular.

In re claim 4, Yu discloses the device of claim 1, wherein the gate length is 100 nm or less. Specifically, the gate length is in the range of 35 to 100 nm (column 4, line 64).

In re claim 5, Yu discloses the device of claim 1, wherein sidewalls of the lower part are, at least partially, covered by silicon dioxide (column 4, lines 47-49). The limitation, "thermally grown" is a product-by-process limitation that is not given patentable weight because the language does not further limit the structure of the claimed invention.

In re claim 6, Yu discloses the device of claim 1, wherein the gate electrode comprises polycrystalline silicon (column 5, lines 34-36) and a metal (column 4, lines 60-63).

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In re claim 7, Yu discloses the device of claim, wherein the upper part comprises a metal (column 4, lines 60-63).

In re claim 8, Yu discloses the device of claim, wherein the substrate (14) is a semiconductor substrate (column 3, line 47-48).

In re claims 27 and 35, Yu discloses a semiconductor device, comprising:

A substrate (14);

A gate insulation layer (38) formed above said substrate;

A gate electrode formed above said gate insulation layer, said gate electrode having an upper portion (56) comprised of polysilicon (column 5, lines 34-36) and a lower portion, said upper portion having a plurality of metal extensions (68) formed on said upper portion comprised of polysilicon, said metal extensions of said upper portion comprised of polysilicon extending laterally beyond said lower portion of said gate electrode by an amount that decreases from bottom to top of the upper portion; and

An etch stop layer (69) covering at least a portion of said sidewalls of said gate electrode.

In re claims 28 and 36, Yu discloses the devices of claims 27 and 35 respectively, further comprising an insulating material (34, 36) positioned adjacent said lower portion of said gate electrode and under said extensions formed on said upper region.

In re claims 29 and 37, Yu discloses the devices of claims 27 and 35 respectively, wherein said substrate is comprised of silicon (column 3, lines 47-48).

In re claims 30 and 38, Yu discloses the devices of claims 27 and 35 respectively, wherein said gate insulation layer is comprised of silicon dioxide (column 4, lines 53-54).

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In re claims 31 and 39, Yu discloses the devices of claims 27 and 35 respectively, wherein said lower portion of said gate electrode is comprised of polysilicon (column 5, lines 34-36).

In re claims 33 and 40, Yu discloses the devices of claims 27 and 35 respectively, wherein said extensions are comprised of polysilicon (column 4, lines 60-62). If the T-shaped conductor (30) is made entirely of polysilicon, the extensions will be made of polysilicon.

In re claims 34 and 41, Yu discloses the devices of claims 27 and 35 respectively, wherein said upper portion of said gate electrode and said extensions have a combined lateral dimension that is approximately 5-100% greater than a lateral dimension of said lower portion of said gate electrode.

In re claim 42, Yu discloses the device of claim 35, wherein said etch stop layer is comprised of silicon dioxide (column 4, lines 53-59). The limitation, "thermally grown" is a product-by-process limitation that is not given patentable weight because the language does not further limit the structure of the claimed invention.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yu as applied to claim 1 above, and further in view of Wu (U.S. Patent No. 6,060,749).

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In re claim 9, Yu discloses the device of claim 1, but does not expressly disclose the active region on an SOI substrate. Wu discloses an active FET device on an SOI substrate. It would have been obvious to one skilled in the art at the time of the invention to form the device of Yu on an SOI substrate as disclosed by Wu for the purpose, for example, of limiting short channel effects or enhancing the drive capability (Wu; column 1, lines 28-32).

Response to Arguments

5. Applicant's arguments with respect to claims 27-31, 33 and 34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 703-308-8137. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Jesse A. Fenty
Examiner
Art Unit 2815



BRADLEY BAUMEISTER
PRIMARY EXAMINER

JAF